

Application No. 10/531,502
Amendment dated September 5, 2007
Reply to Office Action dated March 8, 2007

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-7. (canceled)

8. (new): A method of analyzing a sample, comprising the steps of:

providing an apparatus, comprising:

a laser emitter and an associated longitudinal optical receiver mounted on either side of a horizontal tubular measuring cell located in a cryostatic chamber equipped with a temperature sensor connected to cooling and temperature control members, so that an optical beam emitted by the laser emitter is aligned with a longitudinal axis of the measuring cell and with the longitudinal optical receiver, and wherein the temperature sensor, the cooling and temperature control members and the longitudinal optical receiver are connected to programmable calculating and display means;

a diaphragm mounted directly downstream of the laser emitter, the diaphragm reducing a cross section of the optical beam to prevent reflection of the optical beam on the walls of the measuring cell;

a polarizer mounted upstream of the longitudinal receiver, the polarizer oriented such that the optical beam initially emitted by the laser emitter cannot be transmitted therethrough; and

a lateral optical receiver mounted proximate to an upstream portion of the measuring cell, the lateral optical receiver connected to the programmable calculating and display means and receiving the optical beam emitted by the laser emitter;

obtaining a sample;

introducing the sample into the measuring cell;

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activating the laser emitter, the longitudinal optical receiver and the lateral optical receiver to pass an optical beam through the sample;

gradually lowering the temperature of the cryostatic chamber while recording a detection curve showing the variations in light intensity received by the longitudinal optical receiver as a function of the temperature, and an opacity curve showing the variations in the light intensity received by the lateral optical receiver as a function of the temperature;

determining, using the opacity curve, at least one of the end of crystallization temperature and the point of opacity of the sample;

gradually raising the temperature of the chamber while continuing to record the detection curve and the opacity curve; and

determining the vanishing point of crystals in the sample from the detection curve within a temperature range of -5 to -120°C.

9. (new): The method of Claim 8, wherein the apparatus further comprises a substantially U-shaped measuring tube mounted inside the cryostatic chamber and having a central, substantially horizontal branch constituting the measuring cell and lateral branches through which the sample is introduced into the cell and is removed from the cell, respectively.

10. (new): The method of Claim 8, wherein the light intensity is transmitted to the longitudinal and lateral optical receivers by light guides.

11. (new): The method of Claim 10, wherein the light guides cooperate with lenses capable of concentrating the optical beam.

12. (new): The method of Claim 8, wherein the apparatus further comprises a measuring tube formed as metal element and including ports permitting the passage of the optical beam.

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13. (new): The method of Claim 8, wherein the cooling and temperature control members are constituted by a cooling unit having a cold finger equipped with dry contact heat transmission members cooperating with the cryostatic chamber.

14. (new): The method of Claim 8, wherein the cooling unit is a compact portable device.

15. (new): The method of Claim 8, wherein the sample is a petroleum product.

16. (new): The method of Claim 15, wherein the petroleum product is aviation kerosene.

17. (new): The method of Claim 8, further comprising the step of determining whether the petroleum product is pure or polluted based on the vanishing point of crystals.

18. (new): The method of Claim 8, wherein the apparatus further comprises an auxiliary polarizer mounted downstream of the laser emitter and upstream of the measuring cell, the auxiliary polarizer oriented perpendicularly to the polarizer.

19. (new): The method of Claim 8, wherein the diaphragm includes an aperture having a diameter between 1 mm and 1.5 mm.